CLAIMS

What is claimed is:

1. A receiver comprising:

a subchannel filter selection switch to provide a baseband signal to a selected one of a plurality of subchannel low-pass filters; and

a heterodyne frequency generator to provide one of a plurality of heterodyne frequencies to convert a radio-frequency signal received within a selected subchannel to the baseband signal,

wherein the subchannel low-pass filters are to accumulate signal information from an associated one of a plurality of subchannels during a filter-input sampling interval.

2. The receiver of claim 1 further comprising a system controller to generate a subchannel selection signal for the subchannel filter selection switch and the heterodyne frequency generator,

wherein the selected one of the subchannel low-pass filters corresponds to the selected subchannel of the plurality of subchannels,

wherein the heterodyne frequency generator is responsive to the subchannel selection signal to generate one of the heterodyne frequencies to convert radio-frequency signals within a corresponding one of the subchannels within the filter-input sampling interval,

wherein the subchannel filter selection switch is responsive to the subchannel selection signal to switch between the subchannel low-pass filters, and

wherein the filter-input sampling interval is to occur at least as often as the inverse of a bandwidth of a subchannel.

3. The receiver of claim 1 wherein the receiver is a wideband channel receiver further comprising radio-frequency circuitry to receive orthogonal frequency division multiplexed signals in a wideband channel comprising a plurality of subchannels,

wherein each subchannel low-pass filter corresponds to one of the plurality of subchannels,

wherein the subchannels have a subchannel bandwidth, and

wherein the subchannel low-pass filters have a filter bandwidth of approximately half the subchannel bandwidth.

4. The receiver of claim 1 wherein the receiver further comprises:

a whole-channel analog-to-digital converter; and

a subchannel filter output selection switch responsive to a subchannel filter output selection signal to provide an accumulated signal output from the selected subchannel low-pass filter to the whole-channel analog-to-digital converter.

5. The receiver of claim 4 wherein a wideband channel comprises up to four of the subchannels, the subchannels having bandwidths of approximately 20-MHz,

wherein the whole-channel analog-to-digital converter comprises at least a 9-bit analog-to-digital converter having a sampling rate of at least as great as a bandwidth of the wideband channel,

and wherein the heterodyne frequency generator is to generate heterodyne frequencies during a filter-input sampling interval for each subchannel, the filter-input sampling interval being at least as great as the inverse of the bandwidth of the subchannels, and

wherein the subchannel filter output selection switch responsive to the subchannel filter output selection signal provides accumulated signal outputs from each of the subchannel low-pass filters to the whole-channel analog-to-digital converter once for each filter-output sampling interval, the filter-output sampling interval being at least as great as the inverse of the bandwidth of the subchannels.

6. The receiver of claim 1 further comprising a plurality of subchannel analog-to-digital converters, the subchannel analog-to-digital converters to

receive an accumulated signal output from a corresponding one of the subchannel low-pass filters.

7. The receiver of claim 6 wherein the subchannels have bandwidths of approximately 20-MHz,

wherein the subchannel analog-to-digital converters comprise at least 9-bit analog-to-digital converters having sampling rates of at least as great as a bandwidth of the subchannel, and

wherein the heterodyne frequency generator is to generate heterodyne frequencies or each subchannel during a filter-input sampling interval, the sampling interval being at least as great as the inverse of the bandwidth of the subchannels.

8. The receiver of claim 6 further comprising an attenuator in a radio-frequency signal path responsive to the subchannel selection signal to attenuate the radio-frequency signal and provide a normalized signal level for the selected subchannel filter and a corresponding one of the subchannel analog-to-digital converters.

9. The receiver of claim 1 wherein the heterodyne frequency generator comprises:

a fixed-frequency voltage-controlled oscillator to generate a reference frequency;

a digital synthesizer to generate a selected one of a plurality of stepped frequencies in response to a subchannel selection signal; and

a frequency combiner to combine the reference frequency and the selected one of the stepped frequencies to generate one of the plurality of heterodyne frequencies.

10. The receiver of claim 1 wherein the heterodyne frequency generator comprises:

a plurality of fixed-frequency voltage-controlled oscillators, each fixed-frequency voltage-controlled oscillator to generate a corresponding one of the plurality of heterodyne frequencies; and

a subchannel heterodyne switch to select a heterodyne frequency from one of the fixed-frequency voltage-controlled oscillators in response to a subchannel selection signal.

11. The receiver of claim 1 further comprising:

a plurality of subchannel analog-to-digital converters, the subchannel analog-to-digital converters to receive an accumulated signal output from a corresponding one of the subchannel low-pass filters; and

a plurality of subchannel amplifiers to amplify the accumulated signal outputs based on a gain control signal, the gain control signal being generated for each subchannel.

12. The receiver of claim 1 wherein the receiver further comprises radio-frequency circuitry to receive signals over a single subchannel comprising a plurality of spatial channels,

wherein the radio-frequency circuitry comprises an antenna selection switch to select one of a plurality of antennas corresponding to one of the spatial channels,

wherein each subchannel low-pass filter corresponds to one of the spatial channels,

wherein the heterodyne frequency generator is to provide a single heterodyne frequency to convert radio-frequency signals of the single subchannel to baseband signals, and

wherein the subchannel low-pass filters are to accumulate signal information for a corresponding one of the spatial channels.

13. The receiver of claim 12 further comprising:

a plurality of spatial channel analog-to-digital converters, the spatial channel analog-to-digital converters to receive an accumulated signal output from a corresponding one of the subchannel low-pass filters; and

a digital signal processor to perform fast Fourier transforms on bit streams from the spatial channel analog-to-digital converters and to generate a parallel group of time-domain samples for each of a plurality of symbol-modulated subcarriers that comprise the single subchannel.

14. The receiver of claim 3 wherein the subchannels comprise a plurality of symbol-modulated orthogonal subcarriers, and

wherein each orthogonal subcarrier of a corresponding subchannel has a null at substantially a center frequency of other subcarriers of the corresponding subchannel.

15. The receiver of claim 14 wherein prior to reception by the receiver, the subcarriers are to be individually modulated in accordance with an individual subcarrier modulation assignment comprising one of no modulation, binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), 8PSK, 16-quadrature amplitude modulation (16-QAM), 32-QAM, 64-QAM, 128-QAM, and 256-QAM.

16. A method comprising:

accumulating signal information from a selected one of a plurality of subchannels during a filter-input sampling interval in an associated subchannel low-pass filter;

repeating the accumulating for others of the subchannels during the filter-input sampling interval; and

performing a fast Fourier transform on digital signals generated from the accumulated signal information from the plurality of subchannels to generate a received orthogonal frequency division multiplexed symbol.

17. The method of claim 16 further comprising:

providing a baseband signal to a selected one of a plurality of subchannel low-pass filters during the filter-input sampling interval;

providing, during the filter-input sampling interval, one of a plurality of heterodyne frequencies to convert a radio-frequency signal received within the selected subchannel to the baseband signal.

18. The method of claim 17 further comprising:

generating a subchannel selection signal to responsively provide one of the heterodyne frequencies to downconvert radio-frequency signals within a corresponding one of the subchannels within the filter-input sampling interval; and

switching between the subchannel low-pass filters in response to the subchannel selection signal.

19. The method of claim 18 wherein the subchannel selection signal is generated to provide the filter-input sampling interval at least as often as the inverse of a bandwidth of a subchannel.

20. The method of claim 18 further comprising:

receiving an accumulated signal output from a corresponding one of the subchannel low-pass filters; and

performing an analog-to-digital conversion on the accumulated signal output.

21. The method of claim 20 further comprising:

attenuating, in response to the subchannel selection signal, the radio-frequency signals to provide a normalized signal level for the selected subchannel filter and to perform an analog-to-digital conversion on the accumulated signal output.

22. The method of claim 17 further comprising:

generating a constant reference frequency;

generating, with a digital synthesizer, a selected one of a plurality of stepped frequencies in response to a subchannel selection signal; and

combining the reference frequency and the selected one of the stepped frequencies to generate one of the plurality of heterodyne frequencies.

23. The method of claim 17 further comprising:

performing individual analog-to-digital conversions on accumulated signal outputs from corresponding ones of the subchannel low-pass filters; and

individually amplifying the accumulated signal outputs based on a gain control signal for each subchannel.

24. The method of claim 17 further comprising:

receiving, with a plurality of spatially diverse antennas, an orthogonal frequency division multiplexed symbol over a single subchannel comprising a plurality of spatial channels; and

generating an antenna selection signal to select one of the antennas corresponding to one of the spatial channels,

wherein each subchannel low-pass filter corresponds to one of the spatial channels,

wherein the heterodyne frequency generator provides a single heterodyne frequency to convert radio-frequency signals of the single subchannel to baseband signals, and

wherein the subchannel low-pass filters accumulate signals for a corresponding one of the spatial channels.

25. A system comprising:

a substantially omnidirectional antenna;

a subchannel filter selection switch to provide a baseband signal to a selected one of a plurality of subchannel low-pass filters; and

a heterodyne frequency generator to provide one of a plurality of heterodyne frequencies to convert a radio-frequency signal received within a selected subchannel to the baseband signal,

wherein the subchannel low-pass filters are to accumulate signal information from an associated one of a plurality of subchannels during a filter-input sampling interval.

26. The system of claim 25 further comprising a system controller to generate a subchannel selection signal for the subchannel selection switch and the heterodyne frequency generator,

wherein the selected one of the subchannel low-pass filters corresponds to the selected subchannel of the plurality of subchannels,

wherein the heterodyne frequency generator is responsive to the subchannel selection signal to generate one of the heterodyne frequencies to convert RF signals within a corresponding one of the subchannels within the filter-input sampling interval,

wherein the subchannel selection switch is responsive to the subchannel selection signal to switch between the subchannel low-pass filters, and

wherein the filter-input sampling interval is to occur at least as often as the inverse of a bandwidth of a subchannel.

27. The system of claim 26 further comprising:

a plurality of subchannel analog-to-digital converters, the subchannel analog-to-digital converters to receive an accumulated signal output from a corresponding one of the subchannel low-pass filters; and

an attenuator in a radio-frequency signal path responsive to the subchannel selection signal to attenuate the radio-frequency signal and provide a normalized signal level for the selected subchannel filter and a corresponding one of the subchannel analog-to-digital converters.

28. A machine-readable medium that provides instructions, which when executed by one or more processors, cause said processors to perform operations comprising:

accumulating signal information from one of a plurality of subchannels during a filter-input sampling interval in an associated subchannel low-pass filter;

repeating the accumulating for others of the subchannels during the filter-input sampling interval; and

performing a fast Fourier transform on digital signals generated from the accumulated signal information from the plurality of subchannels to generate a received orthogonal frequency division multiplexed symbol.

29. The machine-readable medium of claim 28 wherein the instructions, when further executed by one or more of said processors, cause said processors to perform operations further comprising:

providing a baseband signal to a selected one of a plurality of subchannel low-pass filters during the filter-input sampling interval;

providing, during the filter-input sampling interval, one of a plurality of heterodyne frequencies to convert a radio-frequency signal received within the selected subchannel to the baseband signal.

30. The machine-readable medium of claim 28 wherein the instructions, when further executed by one or more of said processors, cause said processors to perform operations further comprising:

generating a subchannel selection signal to responsively provide one of the heterodyne frequencies to downconvert radio-frequency signals within a corresponding one of the subchannels within the filter-input sampling interval; and

switching between the subchannel low-pass filters in response to the subchannel selection signal.